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Using algorithms to link-up researchers

Scientists are developing algorithms that can connect researchers across the world who have similar interests by scanning the content of academic papers.

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Researchers at TEAM, an EU-funded project, are using algorithms to quantify the extent to which scientific papers cover similar ground, and are looking at ways to profile scientists by the documents they have searched for. They are also developing technology that can facilitate searches of research papers.

The goal of the project, based at Graz University of Technology, Austria, is to allow researchers with similar interests to make contact with each other, wherever they are in the world.

'With increasing specialisation, we need to find scientists with the same research interests, but outside the same institution, or even abroad,' said Professor Stefanie Lindstaedt, the scientific director of the Know-Center, located at Graz University of Technology, one of the principal partners in the project.

Since the Enlightenment, discoveries have been exchanged, discussed, and peer reviewed before emerging as science. This interaction is all the more important in an age of highly specialised research groups, where progress increasingly depends on bringing expertise together.

In order to find out about how scientists have linked up across different countries, TEAM looked at the digital tracks left by researchers on the Internet. They then developed 'Cross-Country Collaborations' to refine the information. The outcome was the creation of an online map displaying the international research connections of countries across the globe.

Using Cross-Country Collaborations, they found that the European country with the highest number of international research connections is the United Kingdom. The UK has a leading place in cross-border collaboration, with almost as many international connections as the United States, making it the second most internationally connected country for research in the world.

The map also showed that some of the relatively smaller EU Member States such as Denmark, Sweden, Austria, and Belgium have a much higher number of research connections per capita than larger EU countries.

‘The international reach of researchers in small European countries, including Belgium, Denmark, and Austria is remarkable,’ said Prof. Lindstaedt.

Cross-fertilisation

The TEAM project itself was the result of a collaboration between Graz University of Technology and two private companies, Mendeley, and Estonia-based ELIKO, a specialist in collaboration in the fields of electronics and communication technologies.

UK-based Mendeley, a firm which specialises in the creation of research databases, offered the project access to a social network it hosts in which over two million scientists from 113 countries interact in virtual communities.

A Marie-Curie grant aimed specifically at cultivating the transfer of knowledge between business and academia, called Industry-Academia Partnerships and Pathways, supported Peter Kraker, a PhD student at the Know-Center, and Sebastian Pöhlmann and Piotr Drozd, two analysts at Mendeley, in their investigation.

From his first-hand experience of academic research, Kraker is aware of the benefits that collaboration can yield in facilitating cross-fertilisation and synergies, so as to promote exploration in areas which might otherwise remain overlooked.

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‘Collaboration keeps you from stewing in your own juices,' he said. 'Our own experience developing Cross-Country Collaborations offers a good example of this. If the people at Mendeley hadn't approached me with their dataset, I wouldn't have looked into cross-country connections. Without programmes such as Marie-Curie, I wouldn't be in London now developing the project.’

Those involved in the TEAM project are building on its success by developing a desktop application that allows researchers to manage their scientific publications, share them with the public, and open them to public annotation.

‘We’re also planning a website which, at the click of a mouse, yields statistics about scientific publications and authors, trends for different research disciplines, recommendations for papers, and information on peers with similar research interests,’ Prof. Lindstaedt said.

Kraker is also making headway with another virtual map project, Head Start, which is designed to guide researchers through scientific literature. ‘The idea is to present the main areas of activity in a field at a glance, and relevant papers for each area. This should make it easier to grow acquainted with a new field,’ he said.

More info

TEAM

Know Center & Mendeley

ELIKO

Head Start